

Remarks

In response to the Office Action mailed March 20, 2007, Applicants amend the claims to more specifically recite the features of the present inventions. For example, Applicants amend independent claims 1, 11, 19, 31, and 39 to recite systems (claims 1 and 11) and methods (claims 19, 31, and 39) for which the data-gathering probe is moved or adapted to be moved at a substantially constant rate while also gathering data only at specific points in the heart cycle. One advantage of the claimed inventions is evident when analyzing a heart beating at a relatively slow rate. Compared to the present invention, the prior art devices take a relatively longer time period to collect data for a given vessel length in a patient with a slow heart rate, whereas the claimed invention is able to collect data in substantially the same amount of time for a given vessel length irrespective of heart rate. Because the cited references fail to disclose, teach, or suggest all of the features of the presently-claimed inventions, Applicants submit that the rejections should be withdrawn and the claims allowed.

The Examiner rejected claims 1, 6, 7, 11, 14, and 16 as anticipated by U.S. Patent No. 4,501,279 to Seo, claims 1-3, 5-17, and 19-40 as anticipated by U.S. Patent No. 5,771,895 to Slager, claims 4 and 41 as obvious in view of a proposed combination of Slager and U.S. Patent No. 6,200,268 to Vince, and claim 18 as obvious in view of Slager. None of these references, nor the proposed combination of Slager and Vince, discloses, teaches, or suggests the systems and methods of the present inventions that utilize a constant-rate pullback mechanism while gathering data only at specific portions of the heartbeat cycle.

Slager, for example, fails to disclose, teach, or suggest all of the limitations of the presently-claimed inventions. Although the Examiner states that Slager "has an automatic pull back device

which can retract the catheter at a constant speed,” Office Action at 2, Applicants submit that Slager actually describes two different types of systems. Specifically, Slager describes “an automated pull-back of a sheathed IVUS catheter at a speed of, for example 1 mm/second or in case of triggering by the ECG and respiration in, for example, 1 mm steps.” Slager, col. 6, ll. 17-22 (emphasis added). Slager therefore describes either a method in which the sheathed IVUS catheter is pulled back at a constant speed but the data is gathered without respect to a particular point in the heartbeat cycle, or a gated ECG method in which the sheathed IVUS catheter is pulled back a discrete distance and stopped (stepped pullback rather than constant-rate pullback), data is gathered at a specific point in the heartbeat cycle at that location, and the catheter is pulled back another discrete distance and stopped. The present inventions, on the other hand, recite systems and methods in which the data-gathering probe is both pulled back at a constant rate and data is gathered only at specific points in the heartbeat cycle. Slager fails to disclose, teach, or suggest these features, and instead describes only a traditional constant pullback method or a traditional gated ECG/stepped pullback method. Slager is clear in its teaching of two different methods in which “the transducer is pulled back at a constant rate of speed or stepped at equal distances in case of triggering by the electrocardiogram,” Slager, col. 7, ll. 38-40 (emphasis added), but does not disclose, teach, or suggest the feature of the claimed inventions that requires both constant pullback and gathering data only at specific points in the heart cycle.

Vince, likewise, fails to disclose, teach, or suggested the use of both constant pullback of the data-gathering probe and gathering data only at particular points in the heartbeat cycle. Vince describes characterizing a vascular object by mapping an histology image to an IVUS image. Vince does not, however, refer to the use of constant pullback, noting only that “a transducer is inserted

into a vascular object until it reaches a selected section of the vascular object to be analyzed. The transducer is pulsed and then acquires echoes of a backscatter signal reflected from the tissue of the vascular object.” Vince, col. 3, ll. 55-59. There is no description of pulling back the transducer at a constant rate during this data gathering process.

Finally, Seo discloses an apparatus that uses ultrasonic beams to determine blood flow quantity in a blood vessel. Seo simply refers to the use of a “transducing means for sending an ultrasonic wave into a subject,” Seo, col. 1, ll. 59-62, without reference to a constant pullback mechanism, or even the stepped pullback mechanism that Slager describes. Seo fails to disclose, teach, or suggest utilizing a constant pullback mechanism while at the same time gathering data only at certain points in the heart cycle.


Because none of the cited references, either alone or in combination, discloses, teaches, or suggests all of the claimed features of the present invention, such as moving or being adapted to move a data-gathering probe through a blood-vessel at a substantially constant rate while gathering data at specific points in the heart cycle, Applicants submit that the cited references do not anticipate or render obvious (in any combination) the currently-pending claims.

Applicants respectfully submit that this application is now in condition for allowance and request that the Examiner take favorable action. Applicants invite the Examiner to telephone the undersigned representative if the Examiner believes that a telephonic interview would advance this case to allowance, or if any clarifications are necessary.

Respectfully submitted,

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